EFB120 - Damper Actuator On/Off, Spring Return, 100 to 240 VAC









| 1 | REG. EQUIP. |
|---|--|
| Technical Data | |
| Power Supply | 100240 VAC, -20% / +10%, 50/60 Hz, |
| | 100125 VDC, ±10% |
| Power consumption in operation | 9.5 W |
| Power consumption in rest | 4.5 W |
| position | |
| Transformer sizing | 21 VA @ 100 VAC, 29 VA @ 240 VAC |
| Shaft Diameter | 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| Electrical Connection | 3ft [1m], 18 GA appliance cable with 1/2" conduit connector |
| Overload Protection | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Angle of rotation | Max. 95°, adjustable with mechanical end stop, 35° to 95° |
| Torque motor | 270 in-lbs [30 Nm] |
| direction of rotation motor | reversible with CW/CCW mounting |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 75 sec |
| Running time emergency control position | <20 sec @ -4°F to 122°F [-20°C to 50°C], <60 sec @ -22°F [-30°C] |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122 °F [-3050 °C] |
| Non-operating temperature | -40176 °F [-4080 °C] |
| Degree of Protection | IP54, NEMA 2, UL Enclosure Type 2 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 11.57 lb [5.25 kg] |
| | |

†Rated Impulse Voltage 4kV, Type of action 1.AA, Control Pollution Degree 3.

Torque min. 270 in-lb, for control of air dampers

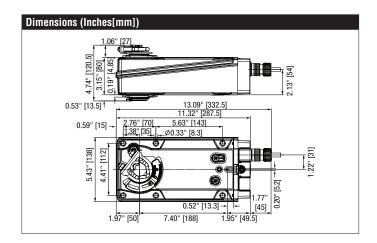
Application

For On/Off, fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. Control is On/Off from an auxiliary contact or a manual switch. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. Maximum of two EF's can be piggybacked for torque loads of up to 540 in-lbs. Minimum 3/4" diameter shaft and parallel wiring.

Operation

The EF..120 series actuators provide true spring return operation for reliable failsafe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The EF..120 series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF..120 actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use flexible metal conduit. Push the UL listed conduit fitting device over the actuator's cable to butt against the enclosure. Screw in conduit connector. Jacket the actuator's input wiring with UL listed flexible conduit. Properly terminate the conduit in a suitable junction box.





EFB120 - Damper Actuator On/Off, Spring Return, 100 to 240 VAC

| Accessorie | 20 |
|------------|--|
| AV8-25 | Shaft extension 240 mm [9.8"] |
| EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). |
| IND-EFB | Stop indicator |
| K9-2 | Spindle clamp set |
| KG10A | Straight ball joint with M8 |
| KH10 | Damper lever |
| KH-EFB | Actuator arm |
| SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). |
| T00L-07 | 13 mm wrench. |
| ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). |
| ZG-120 | Jackshaft mounting bracket. |
| ZG-DC1 | Damper clip for damper blade, 3.5" width. |
| ZG-DC2 | Damper clip for damper blade, 6" width. |
| ZG-EFB | Mounting kit for linkage operation EFA |
| ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). |
| P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. |
| P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. |
| PS-100 | Actuator power supply and control simulator. |
| TF-CC US | Cable conduit connector, 1/2". |
| | |

| Typical | Speci | iicai | ion |
|---------|-------|-------|-----|
| | | | |

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided having the capability of one being adjustable. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Actuators with appliance cables are numbered.

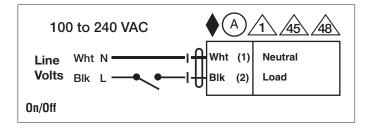


Provide overload protection and disconnect as required.



Actuators may be powered in parallel. Power consumption must be observed.





EFB120-S - Damper Actuator On/Off, Spring Return, 100 to 240 VAC











| • • | REG. EQUIP. |
|-------------------------------------|---|
| Technical Data | |
| Power Supply | 100240 VAC, -20% / +10%, 50/60 Hz, |
| | 100125 VDC, ±10% |
| Power consumption in operation | 9.5 W |
| Power consumption in rest | 4.5 W |
| position | |
| Transformer sizing | 21 VA @ 100 VAC, 29 VA @ 240 VAC |
| Shaft Diameter | 1/2" to 1.05" round, centers on 3/4" with |
| Flori in I O and it | insert, 1.05" without insert |
| Electrical Connection | (2) 3ft [1m], 18 GA appliance cables with |
| Overload Protection | 1/2" conduit connectors |
| | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Angle of rotation | Max. 95°, adjustable with mechanical end |
| Torque motor | stop, 35° to 95° 270 in-lbs [30 Nm] |
| | |
| direction of rotation motor | reversible with CW/CCW mounting |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 75 sec |
| Running time emergency control | <20 sec @ -4°F to 122°F [-20°C to 50°C], |
| position | <60 sec @ -22°F [-30°C] |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122 °F [-3050 °C] |
| Non-operating temperature | -40176 °F [-4080 °C] |
| Degree of Protection | IP54, NEMA 2, UL Enclosure Type 2 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA |
| | E60730-1:02, CE acc. to 2004/108/EC and |
| | 2006/95/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 11.79 lb [5.35 kg] |
| Auxiliary switch | 2 x SPDT, 3A resistive (0.5A inductive) @ |
| - | 250 VAC, one set at 10°, one adjustable |
| | 10° to 90° |

†Rated Impulse Voltage 4kV, Type of Action 1.AA.B, Control Pollution Degree 3.

Torque min. 270 in-lb, for control of air dampers

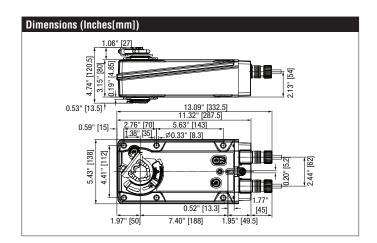
Application

For On/Off, fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. Control is On/Off from an auxiliary contact or a manual switch. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. Maximum of two EF's can be piggybacked for torque loads of up to 540 in-lbs. Minimum 3/4" diameter shaft and parallel wiring.

Operation

The EF..120-S series actuators provide true spring return operation for reliable failsafe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The EF..120-S series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF..120-S versions are provided with two built-in auxiliary switches. These SPDT switches provide safety interfacing or signaling, for example, for fan start-up. The switching function at the fail-safe position is fixed at 10°, the other switch function is adjustable between 10° to +85°. The EF..120-S actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use flexible metal conduit. Push the UL listed conduit fitting device over the actuator's cable to butt against the enclosure. Screw in conduit connector. Jacket the actuator's input wiring with UL listed flexible conduit. Properly terminate the conduit in a suitable junction box.







| Accessorie | ?S |
|------------|--|
| AV8-25 | Shaft extension 240 mm [9.8"] |
| EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). |
| IND-EFB | Stop indicator |
| K9-2 | Spindle clamp set |
| KG10A | Straight ball joint with M8 |
| KH10 | Damper lever |
| KH-EFB | Actuator arm |
| SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). |
| T00L-07 | 13 mm wrench. |
| ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). |
| ZG-120 | Jackshaft mounting bracket. |
| ZG-DC1 | Damper clip for damper blade, 3.5" width. |
| ZG-DC2 | Damper clip for damper blade, 6" width. |
| ZG-EFB | Mounting kit for linkage operation EFA |
| ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). |
| P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. |
| P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. |
| PS-100 | Actuator power supply and control simulator. |
| TF-CC US | Cable conduit connector, 1/2". |
| | |

Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided having the capability of one being adjustable. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.



Actuators with appliance cables are numbered.

Provide overload protection and disconnect as required.

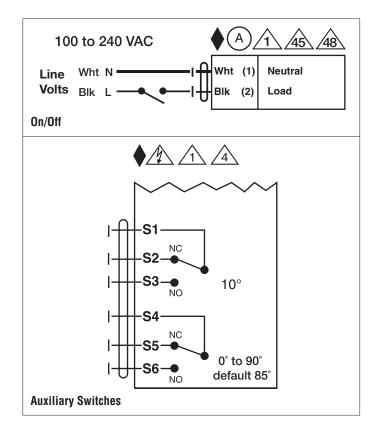


Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.



Actuators may be powered in parallel. Power consumption must be observed.





EFB120-S N4 - Damper Actuator NEMA 4, On/Off, Spring Return, 100 to 240 VAC











| | REG. EQUIP. |
|-------------------------------------|--|
| Technical Data | |
| Power Supply | 100240 VAC, -20% / +10%, 50/60 Hz, |
| | 100125 VDC, ±10% |
| Power consumption in operation | 9.5 W |
| Power consumption in rest | 4.5 W |
| position | |
| Transformer sizing | 21 VA @ 100 VAC, 29 VA @ 240 VAC |
| Shaft Diameter | 1/2" to 1.05" round, centers on 3/4" with |
| Electrical Connection | insert, 1.05" without insert terminal block(s) inside junction box with |
| Liectrical Confidention | knockouts |
| Overload Protection | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Angle of rotation | Max. 95°, adjustable with mechanical end |
| 7 mgro or rotation | stop, 35° to 95° |
| Torque motor | 270 in-lbs [30 Nm] |
| direction of rotation motor | reversible with CW/CCW mounting |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring |
| | return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 75 sec |
| Running time emergency control | <20 sec @ -4°F to 122°F [-20°C to 50°C], |
| position | <60 sec @ -22°F [-30°C] |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122 °F [-3050 °C] |
| Non-operating temperature | -40176 °F [-4080 °C] |
| Degree of Protection | IP66, NEMA 4, UL Enclosure Type 4 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA |
| | E60730-1:02, CE acc. to 2004/108/EC and |
| | 2006/95/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 11.66 lb [5.29 kg] |
| Auxiliary switch | 2 x SPDT, 3A resistive (0.5A inductive) @ |
| | 250 VAC, one set at 10°, one set at 85° |

†Rated Impulse Voltage 4kV, Type of action 1.AA.B, Control Pollution Degree 4.

Torque min. 270 in-lb, for control of air dampers

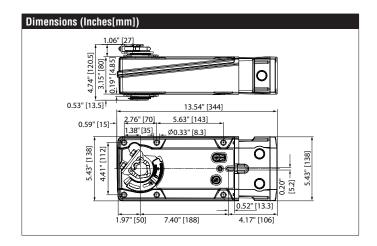
Application

For On/Off, fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. Control is On/Off from an auxiliary contact or a manual switch. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. Maximum of two EF's can be piggybacked for torque loads of up to 540 in-lbs. Minimum 3/4" diameter shaft and parallel wiring.

Operation

The EF..120-S N4 series actuators provide true spring return operation for reliable fail-safe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The EF..120-S N4 series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF..120-S N4 versions are provided with two built-in auxiliary switches. These SPDT switches provide safety interfacing or signaling, for example, for fan start-up. The switching function at the fail-safe position is fixed at 10°, the other switch function is fixed at 85°. The EF..120-S N4 actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use 60°C/75°C copper (CU) conductor and wire size range 12-26 AWG, stranded or solid. If conduit is used, use flexible metal conduit; UL listed and CSA certified strain relief or conduit fitting suitable for outdoor applications, rated NEMA type 4, 4X, 6 or 6X or watertight.





EFB120-S N4 - Damper Actuator

NEMA 4, On/Off, Spring Return, 100 to 240 VAC

| Accessorie | ne e |
|------------|--|
| AV8-25 | Shaft extension 240 mm [9.8"] |
| EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). |
| IND-EFB | Stop indicator |
| K9-2 | Spindle clamp set |
| KG10A | Straight ball joint with M8 |
| KH10 | Damper lever |
| KH-EFB | Actuator arm |
| SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). |
| T00L-07 | 13 mm wrench. |
| ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). |
| ZG-120 | Jackshaft mounting bracket. |
| ZG-DC1 | Damper clip for damper blade, 3.5" width. |
| ZG-DC2 | Damper clip for damper blade, 6" width. |
| ZG-EFB | Mounting kit for linkage operation EFA |
| ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). |
| P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. |
| P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. |
| PS-100 | Actuator power supply and control simulator. |

Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.



Provide overload protection and disconnect as required.



Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.

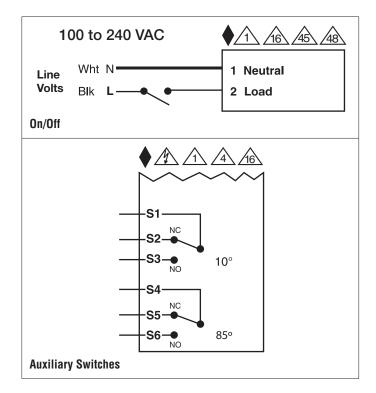


Actuators are provided with a numbered screw terminal strip instead of



Actuators may be powered in parallel. Power consumption must be





EFB24 - Damper Actuator On/Off, Spring Return, 24 VAC/DC









| • | |
|---|--|
| Technical Data | |
| Power Supply | 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / |
| | +20% |
| Power consumption in operation | 9.5 W |
| Power consumption in rest | 4.5 W |
| position | |
| Transformer sizing | 16 VA (class 2 power source) |
| Shaft Diameter | 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| Electrical Connection | 3ft [1m], 18 GA appliance cable with 1/2" conduit connector |
| Overload Protection | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Angle of rotation | Max. 95°, adjustable with mechanical end stop, 35° to 95° |
| Torque motor | 270 in-lbs [30 Nm] |
| direction of rotation motor | reversible with CW/CCW mounting |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 75 sec |
| Running time emergency control position | <20 sec @ -4°F to 122°F [-20°C to 50°C], <60 sec @ -22°F [-30°C] |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122 °F [-3050 °C] |
| Non-operating temperature | -40176 °F [-4080 °C] |
| Degree of Protection | IP54, NEMA 2, UL Enclosure Type 2 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| | |

 \dagger Rated Impulse Voltage 800V, Type of action 1.AA, Control Pollution Degree 3

Torque min. 270 in-lb, for control of air dampers

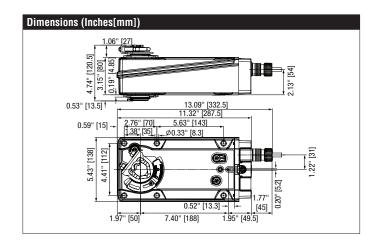
Application

For On/Off, fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. Control is On/Off from an auxiliary contact or a manual switch. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. Maximum of two EF's can be piggybacked for torque loads of up to 540 in-lbs. Minimum 3/4" diameter shaft and parallel wiring.

Operation

The EF..24 series actuators provide true spring return operation for reliable failsafe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The EF..24 series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF..24 actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use flexible metal conduit. Push the UL listed conduit fitting device over the actuator's cable to butt against the enclosure. Screw in conduit connector. Jacket the actuator's input wiring with UL listed flexible conduit. Properly terminate the conduit in a suitable junction box.







| Accessorie | ?S |
|------------|--|
| AV8-25 | Shaft extension 240 mm [9.8"] |
| EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). |
| IND-EFB | Stop indicator |
| K9-2 | Spindle clamp set |
| KG10A | Straight ball joint with M8 |
| KH10 | Damper lever |
| KH-EFB | Actuator arm |
| SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). |
| T00L-07 | 13 mm wrench. |
| ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). |
| ZG-120 | Jackshaft mounting bracket. |
| ZG-DC1 | Damper clip for damper blade, 3.5" width. |
| ZG-DC2 | Damper clip for damper blade, 6" width. |
| ZG-EFB | Mounting kit for linkage operation EFA |
| ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). |
| P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. |
| P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. |
| PS-100 | Actuator power supply and control simulator. |
| TF-CC US | Cable conduit connector, 1/2". |
| ZG-X40 | 120 to 24 VAC, 40 VA transformer. |

| Typical | Specif | icat | ion |
|---------|--------|------|-----|
|---------|--------|------|-----|

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided having the capability of one being adjustable. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Actuators with appliance cables are numbered.



Provide overload protection and disconnect as required.

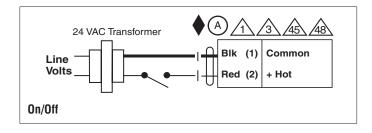


Actuators may also be powered by 24 VDC.



Actuators may be powered in parallel. Power consumption must be observed.





EFB24 N4 - Damper Actuator

NEMA 4, On/Off, Spring Return, 24 V











| To de Cod But | |
|-------------------------------------|--|
| Technical Data | 04.1/4.0 000/ 50/00 H 04.1/DC 100// |
| Power Supply | 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / +20% |
| Power consumption in operation | 9.5 W |
| Power consumption in rest | 4.5 W |
| position | |
| Transformer sizing | 16 VA (class 2 power source) |
| Shaft Diameter | 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| Electrical Connection | terminal block(s) inside junction box with knockouts |
| Overload Protection | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Angle of rotation | Max. 95°, adjustable with mechanical end stop, 35° to 95° |
| Torque motor | 270 in-lbs [30 Nm] |
| direction of rotation motor | reversible with CW/CCW mounting |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 75 sec |
| Running time emergency control | <20 sec @ -4°F to 122°F [-20°C to 50°C], |
| position | <60 sec @ -22°F [-30°C] |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122 °F [-3050 °C] |
| Non-operating temperature | -40176 °F [-4080 °C] |
| Degree of Protection | IP66, NEMA 4, UL Enclosure Type 4 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 11.6 lb [5.26 kg] |
| | |

†Rated Impulse Voltage 800V, Type of action 1.AA, Control Pollution Degree 4.

Torque min. 270 in-lb, for control of air dampers

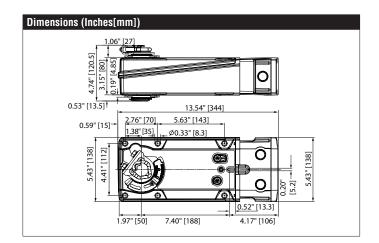
Application

For On/Off, fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. Control is On/Off from an auxiliary contact or a manual switch. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. Maximum of two EF's can be piggybacked for torque loads of up to 540 in-lbs. Minimum 3/4" diameter shaft and parallel wiring.

Operation

The EF.24 N4 series actuators provide true spring return operation for reliable failsafe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The EF.24 N4 series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF.24 N4 actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use 60°C/75°C copper (CU) conductor and wire size range 12-26 AWG, stranded or solid. If conduit is used, use flexible metal conduit; UL listed and CSA certified strain relief or conduit fitting suitable for outdoor applications, rated NEMA type 4, 4X, 6 or 6X or watertight.







| Accessorie | es |
|------------|--|
| AV8-25 | Shaft extension 240 mm [9.8"] |
| EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). |
| IND-EFB | Stop indicator |
| K9-2 | Spindle clamp set |
| KG10A | Straight ball joint with M8 |
| KH10 | Damper lever |
| KH-EFB | Actuator arm |
| SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). |
| T00L-07 | 13 mm wrench. |
| ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). |
| ZG-120 | Jackshaft mounting bracket. |
| ZG-DC1 | Damper clip for damper blade, 3.5" width. |
| ZG-DC2 | Damper clip for damper blade, 6" width. |
| ZG-EFB | Mounting kit for linkage operation EFA |
| ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). |
| P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. |
| P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. |
| PS-100 | Actuator power supply and control simulator. |
| ZG-X40 | 120 to 24 VAC, 40 VA transformer. |
| | |

Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Provide overload protection and disconnect as required.



Actuators may also be powered by 24 VDC.

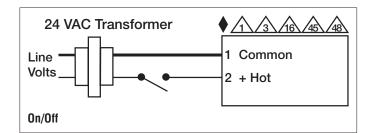


Actuators are provided with a numbered screw terminal strip instead of a cable.

Actuators may be powered in parallel. Power consumption must be



observed.



EFB24-MFT - Damper Actuator

Modulating, Spring Return, 24 V, Multi-Function Technology®









| 7 | REG. EQUIP. US |
|-------------------------------------|---|
| Technical Data | |
| Power Supply | 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / |
| Davier consumption in energtion | +20% |
| Power consumption in operation | |
| Power consumption in rest position | 4.5 W |
| Transformer sizing | 16 VA (class 2 power source) |
| Shaft Diameter | 1/2" to 1.05" round, centers on 3/4" with |
| Shart Diameter | insert, 1.05" without insert |
| Electrical Connection | 3ft [1m], 18 GA appliance cable with 1/2" |
| | conduit connector |
| Overload Protection | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Operating Range | DC 210 V (default), 4 to 20 mA w/ ZG- |
| | R01 (500 Ω , 1/4 W resistor), variable (VDC, |
| | PWM, floating point, on/off) |
| Operating range Y variable | starting point DC 0.530 V |
| | end point DC 2.532 V |
| Input Impedance | 100 kΩ for 2 to 10 VDC (0.1 mA), 500 Ω |
| | for 4 to 20 mA, 1500 Ω for PWM, floating |
| Position Feedback | point and On/Off DC 210 V, Max. 0.5 mA, VDC variable |
| | Max. 95°, adjustable with mechanical end |
| Angle of rotation | stop, 35° to 95° |
| Torque motor | 270 in-lbs [30 Nm] |
| direction of rotation motor | reversible with built-in switch |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring |
| 1 OSITION MUICATION | return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | default 150 sec, variable 60150 sec |
| Running time emergency control | <20 sec @ -4°F to 122°F [-20°C to 50°C], |
| position | <60 sec @ -22°F [-30°C] |
| Angle Of Rotation Adaption | off (default) |
| override control | min. position = 0%, mid. Position = 50%, max. position = 100% (Default) |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122 °F [-3050 °C] |
| Non-operating temperature | -40176 °F [-4080 °C] |
| Degree of Protection | IP54, NEMA 2, UL Enclosure Type 2 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA |
| Agency Listing | E60730-1:02, CE acc. to 2004/108/EC |
| Noise level, motor | ≤45.3 dB (A) @ 150 sec, run time |
| | dependent |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 11.49 lb [5.21 kg] |
| | |

^{*}Variable when configured with MFT options.

†Rated Impulse Voltage 800V, Type of action 1.AA, Control Pollution Degree 3

Torque min. 270 in-lb, for control of air dampers, Control 2 to 10 VDC (Default), Feedback 2 to 10 VDC (Default)

Application

For fail-safe, modulating control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. A feedback signal is provided for position indication or master-slave applications. Two EF's can be piggybacked for torque loads of up to 540 in-lbs. Minimum 3/4" diameter shaft. OR Maximum of three EF's can be piggybacked for torque loads of up to 810 in-lbs. Minimum 1" diameter shaft. Master-Slave wiring for either configuration.

Default/Configuration

Default parameters for 2 to 10 VDC applications of the EF.-MFT actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters are variable and can be changed by three means: Factory pre-set or custom configuration, set by the customer using PC-Tool software or the handheld ZTH US.

Operation

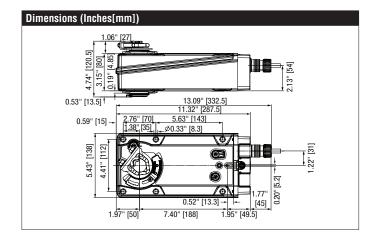
The EF..24-MFT actuator provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator will synchronize the 0° mechanical stop or the physical damper mechanical stop and use this point for its zero position during normal control operations. A unique manual override allows the setting of any actuator position within its 95° of rotation with no power applied. This mechanism can be released physically by the use of a crank supplied with the actuator. When power is applied the manual override is released and the actuator drives toward the fail-safe position. The actuator uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor. The microprocessor provides the intelligence to the ASIC to provide a constant rotation rate and to know the actuator's exact position. The ASIC monitors and controls the brushless DC motor's rotation and provides a Digital Rotation Sensing (DRS) function to prevent damage to the actuator in a stall condition. The position feedback signal is generated without the need for mechanical feedback potentiometers using DRS. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF..24-MFT is mounted directly to control shafts up to 1.05" diameter by means of its universal clamp and anti-rotation bracket. A crank arm and several mounting brackets are available for damper applications where the actuator cannot be direct coupled to the damper shaft. The spring return system provides minimum specified torque to the application during a power interruption. The EF. 24-MFT actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use flexible metal conduit. Push the UL listed conduit fitting device over the actuator's cable to butt against the enclosure. Screw in conduit connector. Jacket the actuator's input wiring with UL listed flexible conduit. Properly terminate the conduit in a suitable junction box.



EFB24-MFT - Damper Actuator Modulating, Spring Return, 24 V, Multi-Function Technology®

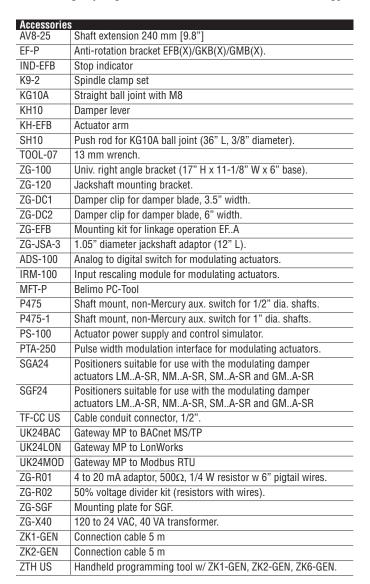
Weight 11.49 lb [5.21 kg]



^{*}Variable when configured with MFT options. †Rated Impulse Voltage 800V, Type of action 1.AA, Control Pollution Degree 3

EFB24-MFT - Damper Actuator

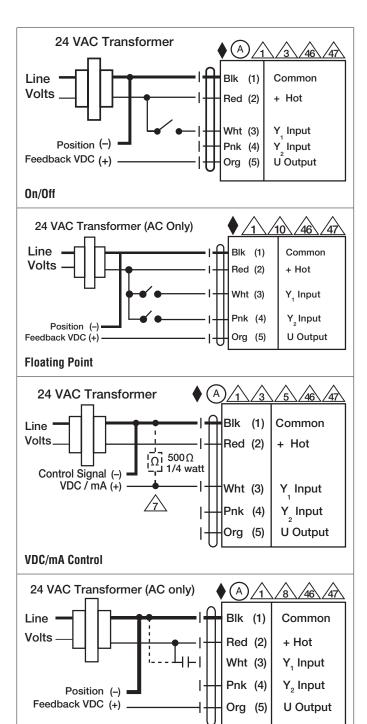
Modulating, Spring Return, 24 V, Multi-Function Technology®



Typical Specification

Spring return control damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuator must provide modulating damper control in response to a 2 to 10 VDC or, with the addition of a 500 Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback or master slave applications. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.





PWM Control



EFB24-MFT - Damper Actuator

Modulating, Spring Return, 24 V, Multi-Function Technology®

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Actuators with appliance cables are numbered.



Provide overload protection and disconnect as required.



Actuators may also be powered by 24 VDC.



Only connect common to negative (-) leg of control circuits. A 500 Ω resistor (ZG-R01) converts the 4 to 20 mA control signal to 2



Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.



For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a triac sink controller; the actuator internal common reference is not compatible.



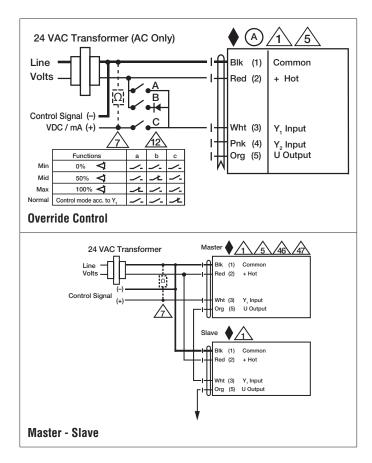
IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).



Actuators may be controlled in parallel. Current draw and input impedance must be observed.



Master-Slave wiring required for piggy-back applications. Feedback from Master to control input(s) of Slave(s).



EFB24-MFT-S - Damper Actuator

Modulating, Spring Return, 24 V, Multi-Function Technology®











| REG. EQUIP. |
|--|
| |
| 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / +20% |
| 9.5 W |
| 4.5 W |
| |
| 16 VA (class 2 power source) |
| 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| (2) 3ft [1m], 18 GA appliance cables with 1/2" conduit connectors |
| electronic throughout 0° to 95° rotation |
| actuators are double insulated |
| DC 210 V (default), 4 to 20 mA w/ ZG-R01 (500 Ω , 1/4 W resistor), variable (VDC, PWM, floating point, on/off) |
| starting point DC 0.530 V end point DC 2.532 V |
| 100 k Ω for 2 to 10 VDC (0.1 mA), 500 Ω for 4 to 20 mA, 1500 Ω for PWM, floating point and On/Off |
| DC 210 V, Max. 0.5 mA, VDC variable |
| Max. 95°, adjustable with mechanical end stop, 35° to 95° |
| 270 in-lbs [30 Nm] |
| reversible with built-in switch |
| reversible with CW/CCW mounting |
| visual indicator, 0° to 95° (0° is full spring return position) |
| 5 mm hex crank (3/16" Allen), supplied |
| default 150 sec, variable 60150 sec |
| <20 sec @ -4°F to 122°F [-20°C to 50°C], <60 sec @ -22°F [-30°C] |
| off (default) |
| min. position = 0%, mid. Position = 50%, max. position = 100% (Default) |
| 5 to 95% RH non-condensing |
| -22122 °F [-3050 °C] |
| -40176 °F [-4080 °C] |
| IP54, NEMA 2, UL Enclosure Type 2 |
| Aluminum die cast and plastic casing |
| cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC |
| ≤45.3 dB (A) @ 150 sec, run time dependent |
| |
| maintenance free |
| ISO 9001 |
| 11.88 lb [5.39 kg] |
| |

Torque min. 270 in-lb, for control of air dampers, Control 2 to 10 VDC (Default), Feedback 2 to 10 VDC (Default)

Application

For fail-safe, modulating control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. A feedback signal is provided for position indication or master-slave applications. Two EF's can be piggybacked for torque loads of up to 540 in-lbs. Minimum 3/4" diameter shaft. OR Maximum of three EF's can be piggybacked for torque loads of up to 810 in-lbs. Minimum 1" diameter shaft. Master-Slave wiring for either configuration.

Default/Configuration

Default parameters for 2 to 10 VDC applications of the EF..-MFT actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters are variable and can be changed by three means: Factory pre-set or custom configuration, set by the customer using PC-Tool software or the handheld ZTH US.

Operation

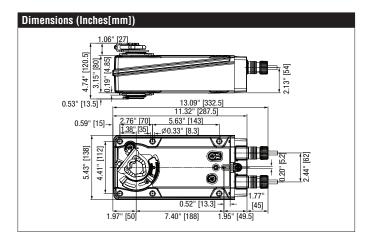
The EF..24-MFT actuator provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator will synchronize the 0° mechanical stop or the physical damper mechanical stop and use this point for its zero position during normal control operations. A unique manual override allows the setting of any actuator position within its 95° of rotation with no power applied. This mechanism can be released physically by the use of a crank supplied with the actuator. When power is applied the manual override is released and the actuator drives toward the fail-safe position. The actuator uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor. The microprocessor provides the intelligence to the ASIC to provide a constant rotation rate and to know the actuator's exact position. The ASIC monitors and controls the brushless DC motor's rotation and provides a Digital Rotation Sensing (DRS) function to prevent damage to the actuator in a stall condition. The position feedback signal is generated without the need for mechanical feedback potentiometers using DRS. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF..24-MFT is mounted directly to control shafts up to 1.05" diameter by means of its universal clamp and anti-rotation bracket. A crank arm and several mounting brackets are available for damper applications where the actuator cannot be direct coupled to the damper shaft. The spring return system provides minimum specified torque to the application during a power interruption. The EF. 24-MFT actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use flexible metal conduit. Push the UL listed conduit fitting device over the actuator's cable to butt against the enclosure. Screw in conduit connector. Jacket the actuator's input wiring with UL listed flexible conduit. Properly terminate the conduit in a suitable junction box.



EFB24-MFT-S - Damper Actuator Modulating, Spring Return, 24 V, Multi-Function Technology®

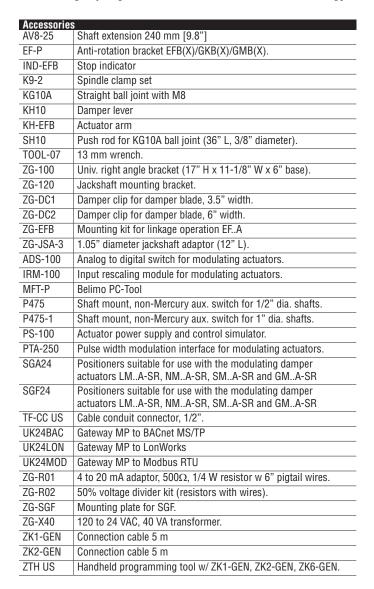
| Quality Standard | ISO 9001 |
|------------------|---|
| Weight | 11.88 lb [5.39 kg] |
| Auxiliary switch | 2 x SPDT, 3A resistive (0.5A inductive) @ |
| | 250 VAC, one set at 10°, one adjustable |
| | 10° to 90° |



^{*}Variable when configured with MFT options. †Rated Impulse Voltage 800V, Type of Action 1.AA.B, Control Pollution Degree 3.

EFB24-MFT-S - Damper Actuator

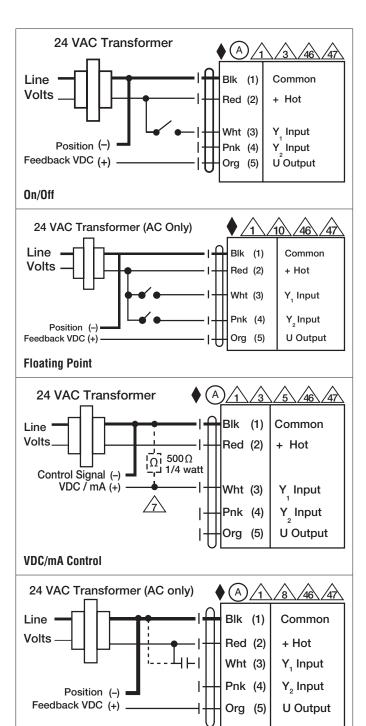
Modulating, Spring Return, 24 V, Multi-Function Technology®



Typical Specification

Spring return control damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuator must provide modulating damper control in response to a 2 to 10 VDC or, with the addition of a 500 Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback or master slave applications. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.





PWM Control



EFB24-MFT-S - Damper Actuator

Modulating, Spring Return, 24 V, Multi-Function Technology®

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection



Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.



Actuators with appliance cables are numbered.



Provide overload protection and disconnect as required.



Actuators may also be powered by 24 VDC.



Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.



Only connect common to negative (-) leg of control circuits.



A 500 Ω resistor (ZG-R01) converts the 4 to 20 mA control signal to 2 to 10 VDC.



Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.



For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a triac sink controller; the actuator internal common reference is not compatible.



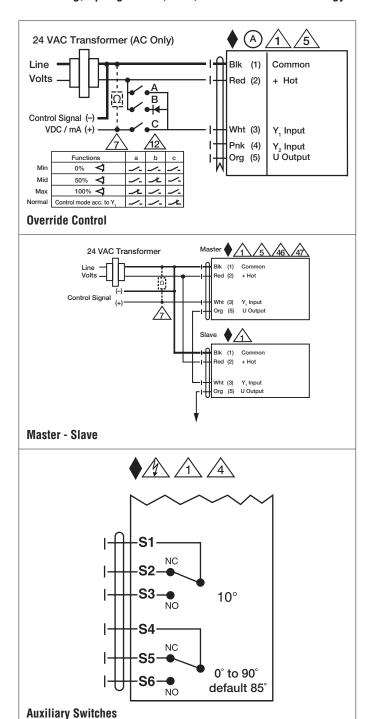
IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).



Actuators may be controlled in parallel. Current draw and input impedance must be observed.



Master-Slave wiring required for piggy-back applications. Feedback from Master to control input(s) of Slave(s).



EFB24-MFT-S N4 - Damper Actuator

NEMA 4, Modulating, Spring Return, 24 V, Multi-Function Technology®









| | TEMP. IND. & C LUS |
|--|---|
| Technical Data | |
| Power Supply | 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / |
| Power consumption in operation | 9.5 W |
| Power consumption in operation Power consumption in rest | 4.5 W |
| position | 4.5 W |
| Transformer sizing | 16 VA (class 2 power source) |
| Shaft Diameter | 1/2" to 1.05" round, centers on 3/4" with |
| | insert, 1.05" without insert |
| Electrical Connection | terminal block(s) inside junction box with |
| | knockouts |
| Overload Protection | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Operating Range | DC 210 V (default), 4 to 20 mA w/ ZG- |
| | R01 (500 Ω , 1/4 W resistor), variable (VDC, |
| Operating range V veriable | PWM, floating point, on/off) |
| Operating range Y variable | starting point DC 0.530 V end point DC 2.532 V |
| Input Impedance | 100 kΩ for 2 to 10 VDC (0.1 mA), 500 Ω |
| patpadaoo | for 4 to 20 mA, 1500 Ω for PWM, floating |
| | point and On/Off |
| Position Feedback | DC 210 V, Max. 0.5 mA, VDC variable |
| Angle of rotation | Max. 95°, adjustable with mechanical end |
| | stop, 35° to 95° |
| Torque motor | 270 in-lbs [30 Nm] |
| direction of rotation motor | reversible with built-in switch |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | default 150 sec, variable 60150 sec |
| Running time emergency control | <20 sec @ -4°F to 122°F [-20°C to 50°C], |
| position | <60 sec @ -22°F [-30°C] |
| Angle Of Rotation Adaption | off (default) |
| override control | min. position = 0%, mid. Position = 50%, max. position = 100% (Default) |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122 °F [-3050 °C] |
| Non-operating temperature | -40176 °F [-4080 °C] |
| Degree of Protection | IP66, NEMA 4, UL Enclosure Type 4 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA |
| | E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC |
| Noise level, motor | ≤45.3 dB (A) @ 150 sec, run time |
| Notice to the state of the stat | dependent |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 1.02 kg |

Torque min. 270 in-lb, for control of air dampers, Control 2 to 10 VDC (Default), Feedback 2 to 10 VDC (Default)

Application

For fail-safe, modulating control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. A feedback signal is provided for position indication or master-slave applications. Two EF's can be piggybacked for torque loads of up to 540 in-lbs. Minimum 3/4" diameter shaft. OR Maximum of three EF's can be piggybacked for torque loads of up to 810 in-lbs. Minimum 1" diameter shaft. Master-Slave wiring for either configuration.

Default/Configuration

Default parameters for 2 to 10 VDC applications of the EF.-MFT actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters are variable and can be changed by three means: Factory pre-set or custom configuration, set by the customer using PC-Tool software or the handheld ZTH US.

Operation

The EF..24-MFT N4 actuator provides 95° of rotation and comes with a graduated position indicator showing 0° to 95°. The actuator will synchronize the 0° mechanical stop or the physical damper mechanical stop and use this as its zero position during normal control operations. A unique manual override allows the setting of any actuator position within its 95° of rotation with no power applied. This mechanism can be released physically by the use of a crank supplied with the actuator. When power is applied the manual override is released and the actuator drives toward the fail-safe position. The actuator uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor. The microprocessor controls the ASIC to provide a constant rotation rate and to know the actuator's exact position. The ASIC monitors and controls the brushless DC motor's rotation and provides a Digital Rotation Sensing (DRS) function to prevent damage to the actuator in a stall condition. The position feedback signal is generated without the need for mechanical feedback potentiometers using DRS. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF..24-MFT N4 is mounted directly to control shafts up to 1.05" diameter with its universal clamp and anti-rotation bracket. A crank arm and several mounting brackets are available for damper applications where the actuator cannot be direct coupled to the damper shaft. The spring return system provides minimum specified torque to the application during a power interruption. The EF. 24-MFT N4 actuator is shipped at 5° (5° from full failsafe) to provide automatic compression against damper gaskets for tight shut-off.

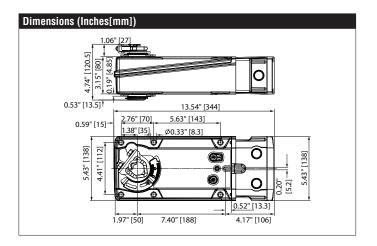
Installation Note: Use 60°C/75°C copper conductor, wire size range 12-26 AWG, stranded or solid. If conduit is used, use flexible metal conduit; UL listed and CSA certified strain relief or conduit fitting suitable for outdoor applications, rated NEMA type 4, 4X, 6, 6X or watertight.



EFB24-MFT-S N4 - Damper Actuator NEMA 4, Modulating, Spring Return, 24 V, Multi-Function Technology®

| Quality Standard | ISO 9001 |
|---|---|
| Weight | 1.02 kg |
| Auxiliary switch 2 x SPDT, 3A resistive (0.5A inducti | |
| | 250 VAC, one set at 10°, one set at 85° |

^{*}Variable when configured with MFT options.



[†]Rated Impulse Voltage 800V, Type of action 1.AA.B, Control Pollution Degree 4.

EFB24-MFT-S N4 - Damper Actuator

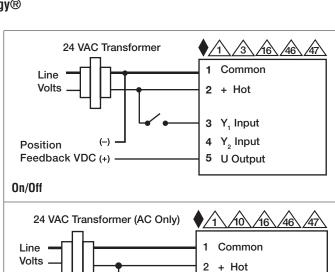
NEMA 4, Modulating, Spring Return, 24 V, Multi-Function Technology®

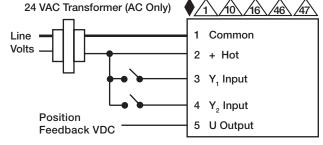


| AV8-25 Shaft extension 240 mm [9.8"] EF-P Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). IND-EFB Stop indicator K9-2 Spindle clamp set KG10A Straight ball joint with M8 KH10 Damper lever KH-EFB Actuator arm SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-DC3 Damper clip for damper blade, 6" width. ZG-SA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to BACnet MS/TP UK24LON Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | Accessorie | • | |
|---|------------|--|--|
| EF-P Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). IND-EFB Stop indicator K9-2 Spindle clamp set KG10A Straight ball joint with M8 KH10 Damper lever KH-EFB Actuator arm SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-DC3 Damper clip for damper blade, 6" width. ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. IRM-100 Input rescaling module for modulating actuators. MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Qateway MP to BACnet MS/TP UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | AV8-25 | | |
| IND-EFB Stop indicator K9-2 Spindle clamp set KG10A Straight ball joint with M8 KH10 Damper lever KH-EFB Actuator arm SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-DC3 Damper clip for damper blade, 6" width. ZG-BFB Mounting kit for linkage operation EF. A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to Bodoes RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | EF-P | | |
| K9-2 Spindle clamp set KG10A Straight ball joint with M8 KH10 Damper lever KH-EFB Actuator arm SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. IRM-100 Input rescaling module for modulating actuators. IRM-101 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PA75-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | IND-EFB | | |
| KG10A Straight ball joint with M8 KH10 Damper lever KH-EFB Actuator arm SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. IRM-100 Input rescaling module for modulating actuators. IRM-101 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PA75-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to BACnet MS/TP UK24LON Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | K9-2 | · | |
| KH10 Damper lever KH-EFB Actuator arm SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-BC3 Mounting kit for linkage operation EF.A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24HOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | KG10A | | |
| Push rod for KG10A ball joint (36" L, 3/8" diameter). TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-BEB Mounting kit for linkage operation EF.A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. IRM-100 P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-R04 120 to 24 VAC, 40 VA transformer. ZK2-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | KH10 | | |
| TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-BC3 Jackshaft mounting kit for linkage operation EF.A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. PS-100 Actuator power supply and control simulator. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | KH-EFB | Actuator arm | |
| TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-BC3 Jackshaft mounting kit for linkage operation EF.A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. PS-100 Actuator power supply and control simulator. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). | |
| ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-EFB Mounting kit for linkage operation EFA ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to BODQ, 1/4 W resistor w 6" pigtail wires. ZG-RO1 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-RO2 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | T00L-07 | - ' | |
| ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-EFB Mounting kit for linkage operation EF.A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). | |
| ZG-DC2 Damper clip for damper blade, 6" width. ZG-EFB Mounting kit for linkage operation EFA ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | ZG-120 | Jackshaft mounting bracket. | |
| ZG-EFB Mounting kit for linkage operation EF. A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P5-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | ZG-DC1 | Damper clip for damper blade, 3.5" width. | |
| ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. IRM-100 Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. IRM-100 FOR P1/2" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR IRM-100 FOR P1/2" dia. shafts. PS-100 FOR P | ZG-DC2 | Damper clip for damper blade, 6" width. | |
| ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | ZG-EFB | Mounting kit for linkage operation EFA | |
| IRM-100 Input rescaling module for modulating actuators. MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). | |
| MFT-P Belimo PC-Tool P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | ADS-100 | Analog to digital switch for modulating actuators. | |
| Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24HOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | IRM-100 | Input rescaling module for modulating actuators. | |
| P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | MFT-P | Belimo PC-Tool | |
| PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24LON Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. | |
| PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. | |
| SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU Gareway MP to Modbus RTU 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. 2G-R02 50% voltage divider kit (resistors with wires). 2G-SGF Mounting plate for SGF. 2G-X40 120 to 24 VAC, 40 VA transformer. 2K1-GEN Connection cable 5 m 2K2-GEN Connection cable 5 m | PS-100 | Actuator power supply and control simulator. | |
| actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | PTA-250 | Pulse width modulation interface for modulating actuators. | |
| actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR UK24BAC Gateway MP to BACnet MS/TP UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | SGA24 | | |
| UK24LON Gateway MP to LonWorks UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | SGF24 | 3 | |
| UK24MOD Gateway MP to Modbus RTU ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | UK24BAC | Gateway MP to BACnet MS/TP | |
| ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | UK24LON | Gateway MP to LonWorks | |
| ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | UK24M0D | , | |
| ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | ZG-R01 | | |
| ZG-X40 120 to 24 VAC, 40 VA transformer. ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | ZG-R02 | 50% voltage divider kit (resistors with wires). | |
| ZK1-GEN Connection cable 5 m ZK2-GEN Connection cable 5 m | ZG-SGF | 0.1 | |
| ZK2-GEN Connection cable 5 m | ZG-X40 | 120 to 24 VAC, 40 VA transformer. | |
| | ZK1-GEN | Connection cable 5 m | |
| ZTH US Handheld programming tool w/ ZK1-GEN, ZK2-GEN, ZK6-GEN. | ZK2-GEN | | |
| | ZTH US | Handheld programming tool w/ ZK1-GEN, ZK2-GEN, ZK6-GEN. | |

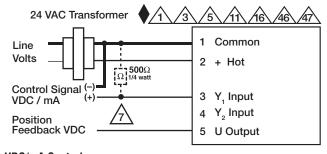
Typical Specification

Spring return control damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuator must provide modulating damper control in response to a 2 to 10 VDC or, with the addition of a 500 Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback or master slave applications. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

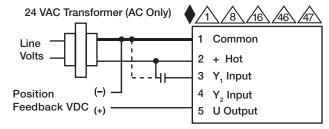




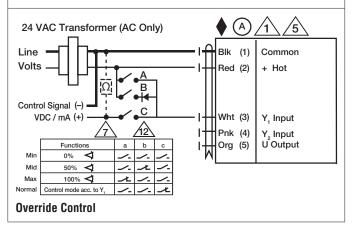
Floating Point



VDC/mA Control



PWM Control





EFB24-MFT-S N4 - Damper Actuator

NEMA 4, Modulating, Spring Return, 24 V, Multi-Function Technology®

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection



Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.



Actuators with appliance cables are numbered.



Provide overload protection and disconnect as required.



Actuators may also be powered by 24 VDC.



Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.



Only connect common to negative (-) leg of control circuits.



A 500 Ω resistor (ZG-R01) converts the 4 to 20 mA control signal to 2 to 10 VDC.



Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.



For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a triac sink controller; the actuator internal common reference is not compatible.



 ${\sf IN4004}$ or ${\sf IN4007}$ diode. (${\sf IN4007}$ supplied, Belimo part number 40155).



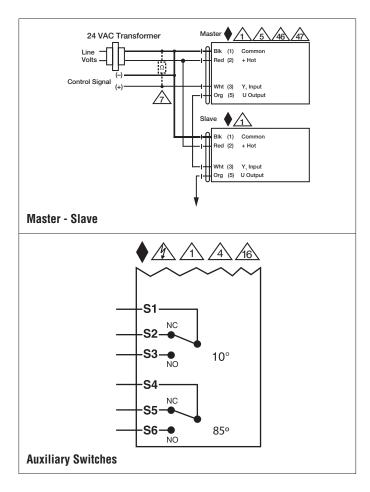
Actuators are provided with a numbered screw terminal strip instead of



Actuators may be controlled in parallel. Current draw and input impedance must be observed.



Master-Slave wiring required for piggy-back applications. Feedback from Master to control input(s) of Slave(s).



EFB24-S - Damper Actuator On/Off, Spring Return, 24 VAC/DC









| ϵ | LISTED 94 D5 TEMP. IND. & REG. EQUIP. | c UL us | | to |
|------------|--|----------|-------|-----|
| | | | | |
| 20% | . 50/60 | Hz. 24 V | DC109 | % / |

| V 1 | REG. EQUIP. |
|-------------------------------------|---|
| Technical Data | |
| Power Supply | 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / |
| | +20% |
| Power consumption in operation | 9.5 W |
| Power consumption in rest | 4.5 W |
| position | |
| Transformer sizing | 16 VA (class 2 power source) |
| Shaft Diameter | 1/2" to 1.05" round, centers on 3/4" with |
| Flactuical Commenting | insert, 1.05" without insert |
| Electrical Connection | (2) 3ft [1m], 18 GA appliance cables with 1/2" conduit connectors |
| Overload Protection | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| | Max. 95°, adjustable with mechanical end |
| Angle of rotation | stop, 35° to 95° |
| Torque motor | 270 in-lbs [30 Nm] |
| direction of rotation motor | reversible with CW/CCW mounting |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring |
| Position indication | return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 75 sec |
| Running time emergency control | <20 sec @ -4°F to 122°F [-20°C to 50°C], |
| position | <60 sec @ -22°F [-30°C] |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122 °F [-3050 °C] |
| Non-operating temperature | -40176 °F [-4080 °C] |
| Degree of Protection | IP54, NEMA 2, UL Enclosure Type 2 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA |
| | E60730-1:02, CE acc. to 2004/108/EC and |
| | 2006/95/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 1278.900000000001 lb [5.28 kg] |
| Auxiliary switch | 2 x SPDT, 3A resistive (0.5A inductive) @ |
| | 250 VAC, one set at 10°, one adjustable |
| | 10° to 90° |

†Rated Impulse Voltage 800V, Type of Action 1.AA.B, Control Pollution Degree 3.

Torque min. 270 in-lb, for control of air dampers

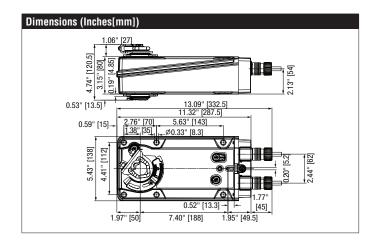
Application

For On/Off, fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. Control is On/Off from an auxiliary contact or a manual switch. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. Maximum of two EF's can be piggybacked for torque loads of up to 540 in-lbs. Minimum 3/4" diameter shaft and parallel wiring.

Operation

The EF..24-S series actuators provide true spring return operation for reliable failsafe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The EF.24-S series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF.24-S versions are provided with two built-in auxiliary switches. These SPDT switches are provided for safety interfacing or signaling, for example, for fan start-up. The switching function at the fail-safe position is fixed at 10°, the other switch function is adjustable between 10° to +85°. The EF..24-S actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use flexible metal conduit. Push the UL listed conduit fitting device over the actuator's cable to butt against the enclosure. Screw in conduit connector. Jacket the actuator's input wiring with UL listed flexible conduit. Properly terminate the conduit in a suitable junction box.





EFB24-S - Damper Actuator

On/Off, Spring Return, 24 VAC/DC

| Accessorie | ?S |
|------------|--|
| AV8-25 | Shaft extension 240 mm [9.8"] |
| EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). |
| IND-EFB | Stop indicator |
| K9-2 | Spindle clamp set |
| KG10A | Straight ball joint with M8 |
| KH10 | Damper lever |
| KH-EFB | Actuator arm |
| SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). |
| T00L-07 | 13 mm wrench. |
| ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). |
| ZG-120 | Jackshaft mounting bracket. |
| ZG-DC1 | Damper clip for damper blade, 3.5" width. |
| ZG-DC2 | Damper clip for damper blade, 6" width. |
| ZG-EFB | Mounting kit for linkage operation EFA |
| ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). |
| P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. |
| P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. |
| PS-100 | Actuator power supply and control simulator. |
| TF-CC US | Cable conduit connector, 1/2". |
| ZG-X40 | 120 to 24 VAC, 40 VA transformer. |

Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided having the capability of one being adjustable. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.



Actuators with appliance cables are numbered.



Provide overload protection and disconnect as required.



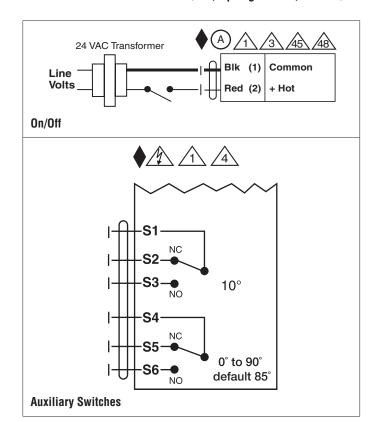
Actuators may also be powered by 24 VDC.



Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.

Actuators may be powered in parallel. Power consumption must be





EFB24-S N4 - Damper Actuator

NEMA 4, On/Off, Spring Return, 24 V











| Technical Data | |
|---|--|
| Power Supply | 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / +20% |
| Power consumption in operation | 9.5 W |
| Power consumption in rest position | 4.5 W |
| Transformer sizing | 16 VA (class 2 power source) |
| Shaft Diameter | 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| Electrical Connection | terminal block(s) inside junction box with knockouts |
| Overload Protection | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Angle of rotation | Max. 95°, adjustable with mechanical end stop, 35° to 95° |
| Torque motor | 270 in-lbs [30 Nm] |
| direction of rotation motor | reversible with CW/CCW mounting |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 75 sec |
| Running time emergency control position | <20 sec @ -4°F to 122°F [-20°C to 50°C], <60 sec @ -22°F [-30°C] |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122 °F [-3050 °C] |
| Non-operating temperature | -40176 °F [-4080 °C] |
| Degree of Protection | IP66, NEMA 4, UL Enclosure Type 4 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 1.02 kg |
| Auxiliary switch | 2 x SPDT, 3A resistive (0.5A inductive) @ 250 VAC, one set at 10°, one set at 85° |

†Rated Impulse Voltage 800V, Type of action 1.AA.B, Control Pollution Degree 4.

Torque min. 270 in-lb, for control of air dampers

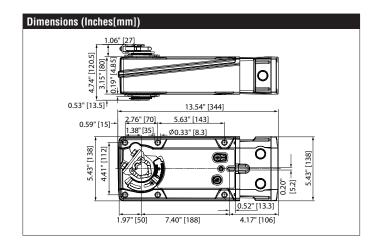
Application

For On/Off, fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. Control is On/Off from an auxiliary contact or a manual switch. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. Maximum of two EF's can be piggybacked for torque loads of up to 540 in-lbs. Minimum 3/4" diameter shaft and parallel wiring.

Operation

The EF.24-S N4 series actuators provide true spring return operation for reliable failsafe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The EF.24-S N4 series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF.24-S N4 versions are provided with two built-in auxiliary switches. These SPDT switches are provided for safety interfacing or signaling, for example, for fan start-up. The switching function at the fail-safe position is fixed at 10°, the other switch function is fixed at 85°. The EF.24-S N4 actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use 60°C/75°C copper (CU) conductor and wire size range 12-26 AWG, stranded or solid. If conduit is used, use flexible metal conduit; UL listed and CSA certified strain relief or conduit fitting suitable for outdoor applications, rated NEMA type 4, 4X, 6 or 6X or watertight.





EFB24-S N4 - Damper Actuator

NEMA 4, On/Off, Spring Return, 24 V

| Accessorio AV8-25 | Shaft extension 240 mm [9.8"] |
|----------------------|--|
| EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). |
| IND-EFB | Stop indicator |
| K9-2 | Spindle clamp set |
| KG10A | Straight ball joint with M8 |
| KH10 | Damper lever |
| KH-EFB | Actuator arm |
| SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). |
| T00L-07 | 13 mm wrench. |
| ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). |
| ZG-120 | Jackshaft mounting bracket. |
| ZG-DC1 | Damper clip for damper blade, 3.5" width. |
| ZG-DC2 | Damper clip for damper blade, 6" width. |
| ZG-EFB | Mounting kit for linkage operation EFA |
| ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). |
| P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. |
| P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. |
| PS-100 | Actuator power supply and control simulator. |
| ZG-X40 | 120 to 24 VAC, 40 VA transformer. |

Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.



Provide overload protection and disconnect as required.



Actuators may also be powered by 24 VDC.



Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.

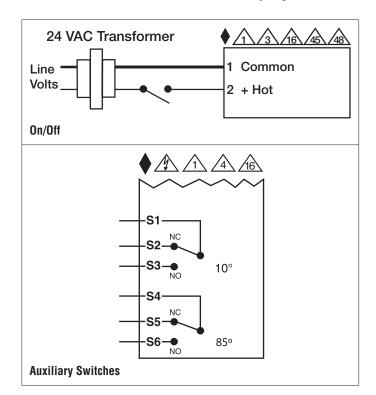
Actuators are provided with a numbered screw terminal strip instead of



a cable.

Actuators may be powered in parallel. Power consumption must be observed.





EFB24-SR - Damper Actuator











| • | and a second |
|---|--|
| Technical Data | |
| Power Supply | 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / +20% |
| Power consumption in operation | 8 W |
| Power consumption in rest | 4.5 W |
| position | |
| Transformer sizing | 14 VA (class 2 power source) |
| Shaft Diameter | 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| Electrical Connection | 3 ft [1 m], 18 GA appliance cable with 1/2" conduit connector |
| Overload Protection | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Operating Range | DC 210 V, 420 mA w/ ZG-R01 (500 Ω, 1/4 W resistor) |
| Input Impedance | 100 k Ω for 210 VDC (0.1 mA), 500 Ω for 420 mA |
| Position Feedback | DC 210 V, Max. 0.5 mA |
| Angle of rotation | Max. 95°, adjustable with mechanical end stop, 35° to 95° |
| Torque motor | 270 in-lb [30 Nm] |
| direction of rotation motor | reversible with built-in switch |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 95 sec |
| Running time emergency control position | <20 sec @ -4122°F [-2050°C], <60 sec @ -22°F [-30°C] |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122°F [-3050°C] |
| Non-operating temperature | -40176°F [-4080°C] |
| Degree of Protection | IP54, NEMA 2, UL Enclosure Type 2 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 11.31 lb [5.13 kg] |
| | , |

 \dagger Rated Impulse Voltage 800V, Type of action 1.AA, Control Pollution Degree 3

Torque min. 270 in-lb, for control of air dampers

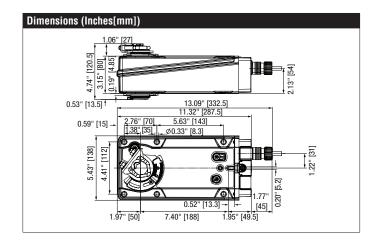
Application

For fail-safe, modulating control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. The actuator operates in response to a 2 to 10 VDC or, with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. A 2 to 10 VDC feedback signal is provided for position indication. Not to be used for a master-slave application.

Operation

The EF..24-SR series actuators provide true spring return operation for reliable failsafe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The EF..24-SR series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The EF..24-SR uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor. The microprocessor provides the intelligence to the ASIC to provide a constant rotation rate and to know the actuator's exact fail-safe position. The ASIC monitors and controls the brushless DC motor's rotation and provides a digital rotation sensing function to prevent damage to the actuator in a stall condition. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF..24-SR actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use flexible metal conduit. Push the UL listed conduit fitting device over the actuator's cable to butt against the enclosure. Screw in conduit connector. Jacket the actuator's input wiring with UL listed flexible conduit. Properly terminate the conduit in a suitable junction box.



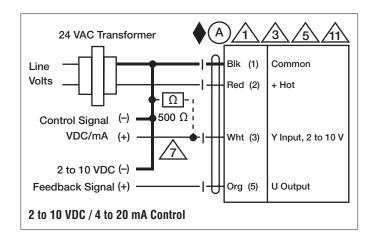
EFB24-SR - Damper Actuator

Modulating, Spring Return, 24 VAC/DC, for 2 to 10 VDC or 4...20 mA Control Signal

| Accessorie | |
|----------------------|---|
| Accessorie AV8-25 | Shaft extension 240 mm [9.8"] |
| EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). |
| IND-EFB | Stop indicator |
| K9-2 | Spindle clamp set |
| KG10A | Straight ball joint with M8 |
| KH10 | Damper lever |
| KH-EFB | Actuator arm |
| SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). |
| T00L-07 | 13 mm wrench. |
| ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). |
| ZG-120 | Jackshaft mounting bracket. |
| ZG-DC1 | Damper clip for damper blade, 3.5" width. |
| ZG-DC2 | Damper clip for damper blade, 6" width. |
| ZG-EFB | Mounting kit for linkage operation EFA |
| ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). |
| ADS-100 | Analog to digital switch for modulating actuators. |
| IRM-100 | Input rescaling module for modulating actuators. |
| P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. |
| P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. |
| PS-100 | Actuator power supply and control simulator. |
| PTA-250 | Pulse width modulation interface for modulating actuators. |
| SGA24 | Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR |
| SGF24 | Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR |
| TF-CC US | Cable conduit connector, 1/2". |
| ZG-R01 | 4 to 20 mA adaptor, 500Ω , $1/4$ W resistor w 6" pigtail wires. |
| ZG-R02 | 50% voltage divider kit (resistors with wires). |
| ZG-SGF | Mounting plate for SGF. |
| ZG-X40 | 120 to 24 VAC, 40 VA transformer. |
| | |

Typical Specification

Spring return control damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuator must provide modulating damper control in response to a 2 to 10 VDC or, with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.



EFB24-SR - Damper Actuator





Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Actuators with appliance cables are numbered.



Provide overload protection and disconnect as required.



Actuators may also be powered by 24 VDC.



Only connect common to negative (-) leg of control circuits.



A 500 Ω resistor (ZG-R01) converts the 4 to 20 mA control signal to 2 to 10 VDC.



Actuators may be connected in parallel if not mechanically linked. Power consumption and input impedance must be observed.

EFB24-SR N4 - Damper Actuator

NEMA 4, Modulating, Spring Return, 24 V, for 2 or 10 VDC or 4...20 mA Control Signal











| | REG. EQUIP. |
|-------------------------------------|---|
| Technical Data | |
| Power Supply | 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / |
| | +20% |
| Power consumption in operation | 8 W |
| Power consumption in rest | 4.5 W |
| position | |
| Transformer sizing | 14 VA (class 2 power source) |
| Shaft Diameter | 1/2" to 1.05" round, centers on 3/4" with |
| Flori Cod Occupio | insert, 1.05" without insert |
| Electrical Connection | terminal block(s) inside junction box with |
| Overload Protection | knockouts electronic throughout 0° to 95° rotation |
| | |
| Electrical Protection | actuators are double insulated |
| Operating Range | DC 210 V, 420 mA w/ ZG-R01 (500 Ω, |
| Input Impedance | 1/4 W resistor) 100 kΩ for 210 VDC (0.1 mA), 500 Ω for |
| iliput illipedance | 420 mA |
| Position Feedback | DC 210 V, Max. 0.5 mA |
| Angle of rotation | Max. 95°, adjustable with mechanical end |
| Angle of rotation | stop, 35° to 95° |
| Torque motor | 270 in-lb [30 Nm] |
| direction of rotation motor | reversible with built-in switch |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring |
| 1 Osition maleation | return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 95 sec |
| Running time emergency control | <pre><20 sec @ -4122°F [-2050°C], <60 sec</pre> |
| position | @ -22°F [-30°C] |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122°F [-3050°C] |
| Non-operating temperature | -40176°F [-4080°C] |
| Degree of Protection | IP66, NEMA 4, UL Enclosure Type 4 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA |
| go.log Liothig | E60730-1:02, CE acc. to 2004/108/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 6.28 lb [5.3 kg] |
| vvoigiit | 0.20 ib [0.0 kg] |

†Rated Impulse Voltage 800V, Type of action 1.AA, Control Pollution Degree 4.

Torque min. 270 in-lb, for control of air dampers

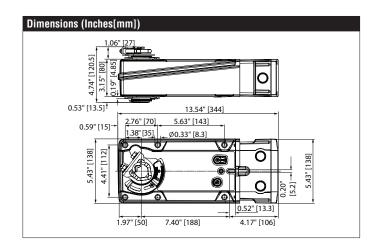
Application

For fail-safe, modulating control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. The actuator operates in response to a 2 to 10 VDC or, with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. A 2 to 10 VDC feedback signal is provided for position indication. Not to be used for a master-slave application.

Operation

The EF..24-SR N4 series actuators provide true spring return operation for reliable failsafe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The EF..24-SR N4 series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The EF..24-SR N4 uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor. The microprocessor provides the intelligence to the ASIC to provide a constant rotation rate and to know the actuator's exact fail-safe position. The ASIC monitors and controls the brushless DC motor's rotation and provides a digital rotation sensing function to prevent damage to the actuator in a stall condition. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF..24-SR N4 actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use 60°C/75°C copper (CU) conductor and wire size range 12-26 AWG, stranded or solid. If conduit is used, use flexible metal conduit; UL listed and CSA certified strain relief or conduit fitting suitable for outdoor applications, rated NEMA type 4, 4X, 6 or 6X or watertight.





EFB24-SR N4 - Damper Actuator NEMA 4, Modulating, Spring Return, 24 V, for 2 or 10 VDC or 4...20 mA Control Signal

Volts

| AV8-25 Shaft extension 240 mm [9.8"] EF-P Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). IND-EFB Stop indicator K9-2 Spindle clamp set KG10A Straight ball joint with M8 KH10 Damper lever KH-EFB Actuator arm SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). TO0L-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-EFB Mounting kit for linkage operation EF.A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. IRM-101 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. P5-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-SGF Mounting plate for SGF. ZG-X40 120 to 24 VAC, 40 VA transformer. | Accessorie | 25 |
|---|------------|--|
| IND-EFB Stop indicator K9-2 Spindle clamp set KG10A Straight ball joint with M8 KH10 Damper lever KH-EFB Actuator arm SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-BFB Mounting kit for linkage operation EF.A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). | | |
| K9-2 Spindle clamp set KG10A Straight ball joint with M8 KH10 Damper lever KH-EFB Actuator arm SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-FFB Mounting kit for linkage operation EF.A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). |
| KG10A Straight ball joint with M8 KH10 Damper lever KH-EFB Actuator arm SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-FFB Mounting kit for linkage operation EF. A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | IND-EFB | Stop indicator |
| KH10 Damper lever KH-EFB Actuator arm SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-FFB Mounting kit for linkage operation EF. A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | K9-2 | Spindle clamp set |
| KH-EFB Actuator arm SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). T00L-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-EFB Mounting kit for linkage operation EF. A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | KG10A | Straight ball joint with M8 |
| SH10 Push rod for KG10A ball joint (36" L, 3/8" diameter). TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-BFB Mounting kit for linkage operation EF. A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | KH10 | Damper lever |
| TOOL-07 13 mm wrench. ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-BFB Mounting kit for linkage operation EFA ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). | KH-EFB | Actuator arm |
| ZG-100 Univ. right angle bracket (17" H x 11-1/8" W x 6" base). ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-EFB Mounting kit for linkage operation EFA ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). |
| ZG-120 Jackshaft mounting bracket. ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-EFB Mounting kit for linkage operation EFA ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | T00L-07 | 13 mm wrench. |
| ZG-DC1 Damper clip for damper blade, 3.5" width. ZG-DC2 Damper clip for damper blade, 6" width. ZG-EFB Mounting kit for linkage operation EFA ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1'/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). | ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). |
| ZG-DC2 Damper clip for damper blade, 6" width. ZG-EFB Mounting kit for linkage operation EFA ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | ZG-120 | Jackshaft mounting bracket. |
| ZG-EFB Mounting kit for linkage operation EF.A ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P5-10 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LM.A-SR, NM.A-SR, SM.A-SR and GM.A-SR SGF24 Positioners suitable for use with the modulating damper actuators LM.A-SR, NM.A-SR, SM.A-SR and GM.A-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | ZG-DC1 | Damper clip for damper blade, 3.5" width. |
| ZG-JSA-3 1.05" diameter jackshaft adaptor (12" L). ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P5-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | ZG-DC2 | Damper clip for damper blade, 6" width. |
| ADS-100 Analog to digital switch for modulating actuators. IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | ZG-EFB | Mounting kit for linkage operation EFA |
| IRM-100 Input rescaling module for modulating actuators. P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). |
| P475 Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | ADS-100 | Analog to digital switch for modulating actuators. |
| P475-1 Shaft mount, non-Mercury aux. switch for 1" dia. shafts. PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | IRM-100 | Input rescaling module for modulating actuators. |
| PS-100 Actuator power supply and control simulator. PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. |
| PTA-250 Pulse width modulation interface for modulating actuators. SGA24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. |
| $ \begin{array}{lll} SGA24 & Positioners suitable for use with the modulating damper actuators \\ LMA-SR, NMA-SR, SMA-SR and GMA-SR \\ SGF24 & Positioners suitable for use with the modulating damper actuators \\ LMA-SR, NMA-SR, SMA-SR and GMA-SR \\ ZG-R01 & 4 to 20 mA adaptor, 500\Omega, 1/4 W resistor w 6" pigtail wires. \\ ZG-R02 & 50\% voltage divider kit (resistors with wires). \\ ZG-SGF & Mounting plate for SGF. \\ \end{array} $ | PS-100 | Actuator power supply and control simulator. |
| LMA-SR, NMA-SR, SMA-SR and GMA-SR SGF24 Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR ZG-R01 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires. ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | PTA-250 | Pulse width modulation interface for modulating actuators. |
| | SGA24 | |
| ZG-R02 50% voltage divider kit (resistors with wires). ZG-SGF Mounting plate for SGF. | SGF24 | |
| ZG-SGF Mounting plate for SGF. | ZG-R01 | 4 to 20 mA adaptor, 500Ω , $1/4$ W resistor w 6" pigtail wires. |
| | ZG-R02 | 50% voltage divider kit (resistors with wires). |
| ZG-X40 120 to 24 VAC, 40 VA transformer. | ZG-SGF | Mounting plate for SGF. |
| | ZG-X40 | 120 to 24 VAC, 40 VA transformer. |

Typical Specification

Spring return control damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuator must provide modulating damper control in response to a 2 to 10 VDC or, with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

EFB24-SR N4 - Damper Actuator



Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Provide overload protection and disconnect as required.



Actuators may also be powered by 24 VDC.



Only connect common to negative (-) leg of control circuits.



Actuators may be connected in parallel if not mechanically linked. Power consumption and input impedance must be observed.



Actuators are provided with a numbered screw terminal strip instead of a cable.

EFB24-SR-S - Damper Actuator

Modulating, Spring Return, 24 VAC/DC, for 2 to 10 VDC or 4...20 mA Control Signal











| Power Supply Power consumption in operation Power consumption in rest position Fransformer sizing Shaft Diameter Electrical Connection Diverload Protection | 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / +20% 8 W 4.5 W 14 VA (class 2 power source) 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert (2) 3 ft [1 m], 18 GA appliance cables with |
|---|--|
| Power Supply Power consumption in operation Power consumption in rest position Transformer sizing Shaft Diameter Electrical Connection Diverload Protection | +20% 8 W 4.5 W 14 VA (class 2 power source) 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| Power consumption in rest position Transformer sizing Shaft Diameter Electrical Connection Overload Protection | 8 W 4.5 W 14 VA (class 2 power source) 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| Power consumption in rest position Transformer sizing Shaft Diameter Electrical Connection Overload Protection | 4.5 W 14 VA (class 2 power source) 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| oosition Fransformer sizing Shaft Diameter Electrical Connection Overload Protection | 14 VA (class 2 power source) 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| Fransformer sizing Shaft Diameter Electrical Connection Overload Protection | 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| Shaft Diameter Electrical Connection Overload Protection | 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| Electrical Connection Overload Protection | insert, 1.05" without insert |
| Overload Protection | |
| Overload Protection | 1 (2) 3 [[]] []]. 10 UA ADDIIANCE CADIES WITH |
| | 1/2" conduit connectors |
| | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Operating Range | DC 210 V, 420 mA w/ ZG-R01 (500 Ω, |
| | 1/4 W resistor) |
| nput Impedance | 100 kΩ for 210 VDC (0.1 mA), 500 Ω for |
| | 420 mA |
| Position Feedback | DC 210 V, Max. 0.5 mA |
| Angle of rotation | Max. 95°, adjustable with mechanical end |
| | stop, 35° to 95° |
| Torque motor | 270 in-lb [30 Nm] |
| lirection of rotation motor | reversible with built-in switch |
| lirection of rotation spring-return | |
| Position indication | visual indicator, 0° to 95° (0° is full spring |
| Associate and a second as | return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 95 sec |
| Running time emergency control position | <20 sec @ -4122°F [-2050°C], <60 sec @ -22°F [-30°C] |
| Angle Of Rotation Adaption | manual, by double clicking cw/ccw switch |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122°F [-3050°C] |
| Non-operating temperature | -40176°F [-4080°C] |
| Degree of Protection | IP54, NEMA 2, UL Enclosure Type 2 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA |
| igono, Liounig | E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| | |
| | 1.00 |
| | 1 |
| nuxilidi y SWILLII | 250 VAC, one set at 10°, one adjustable |
| | Loo vao, one set at 10, one aujustable |
| Quality Standard Weight Auxiliary switch | ISO 9001 11.46 lb [5.2 kg] 2 x SPDT, 3A resistive (0.5A inductive) @ |

†Rated Impulse Voltage 800V, Type of Action 1.AA.B, Control Pollution Degree 3.

Torque min. 270 in-lb, for control of air dampers

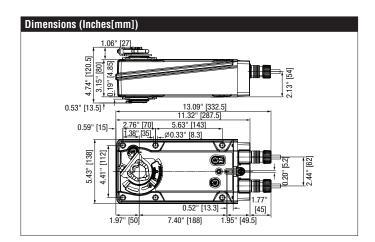
Application

For fail-safe, modulating control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. The actuator operates in response to a 2 to 10 VDC or, with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. A 2 to 10 VDC feedback signal is provided for position indication. Not to be used for a master-slave application.

Operation

The EF. 24-SR-S series actuators provide true spring return operation for reliable failsafe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. EF..24-SR-S actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off. The EF.24-SR-S series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The EF.24-SR-S uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor. The microprocessor provides the intelligence to the ASIC to provide a constant rotation rate and to know the actuator's exact fail-safe position. The ASIC monitors and controls the brushless DC motor's rotation and provides a digital rotation sensing function to prevent damage to the actuator in a stall condition. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF..24-SR-S versions are provided with two built-in auxiliary switches. These SPDT switches provide safety interfacing or signaling, for example, for fan start-up. The switching function at the fail-safe position is fixed at 10°, the other switch function is adjustable between 10° to +85°.

Installation Note: Use flexible metal conduit. Push the UL listed conduit fitting device over the actuator's cable to butt against the enclosure. Screw in conduit connector. Jacket the actuator's input wiring with UL listed flexible conduit. Properly terminate the conduit in a suitable junction box.



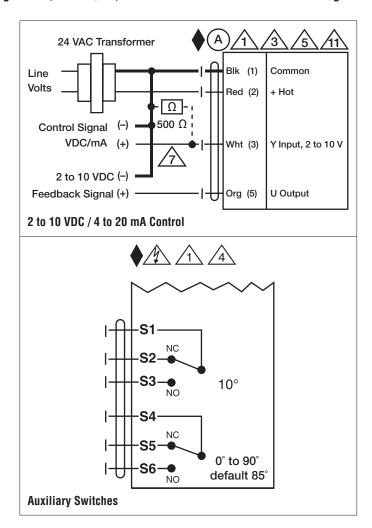
EFB24-SR-S - Damper Actuator

Modulating, Spring Return, 24 VAC/DC, for 2 to 10 VDC or 4...20 mA Control Signal

| Accessorie | 25 |
|------------|---|
| AV8-25 | Shaft extension 240 mm [9.8"] |
| EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). |
| IND-EFB | Stop indicator |
| K9-2 | Spindle clamp set |
| KG10A | Straight ball joint with M8 |
| KH10 | Damper lever |
| KH-EFB | Actuator arm |
| SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). |
| T00L-07 | 13 mm wrench. |
| ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). |
| ZG-120 | Jackshaft mounting bracket. |
| ZG-DC1 | Damper clip for damper blade, 3.5" width. |
| ZG-DC2 | Damper clip for damper blade, 6" width. |
| ZG-EFB | Mounting kit for linkage operation EFA |
| ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). |
| ADS-100 | Analog to digital switch for modulating actuators. |
| IRM-100 | Input rescaling module for modulating actuators. |
| P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. |
| P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. |
| PS-100 | Actuator power supply and control simulator. |
| PTA-250 | Pulse width modulation interface for modulating actuators. |
| SGA24 | Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR |
| SGF24 | Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR |
| TF-CC US | Cable conduit connector, 1/2". |
| ZG-R01 | 4 to 20 mA adaptor, 500Ω , $1/4$ W resistor w 6" pigtail wires. |
| ZG-R02 | 50% voltage divider kit (resistors with wires). |
| ZG-SGF | Mounting plate for SGF. |
| ZG-X40 | 120 to 24 VAC, 40 VA transformer. |

Typical Specification

Spring return control damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuator must provide modulating damper control in response to a 2 to 10 VDC or, with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.



EFB24-SR-S - Damper Actuator

Modulating, Spring Return, 24 VAC/DC, for 2 to 10 VDC or 4...20 mA Control Signal



Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.



Actuators with appliance cables are numbered.



Provide overload protection and disconnect as required.



Actuators may be connected in parallel. Power consumption and input impedance must be observed.



Actuators may also be powered by 24 VDC.



Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.



Only connect common to negative (-) leg of control circuits.



A 500 Ω resistor (ZG-R01) converts the 4 to 20 mA control signal to 2 to 10 VDC.



Actuators may be connected in parallel if not mechanically linked. Power consumption and input impedance must be observed.

EFB24-SR-S N4 - Damper Actuator













| | REG. EQUIP. |
|---|--|
| Technical Data | |
| Power Supply | 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / |
| | +20% |
| Power consumption in operation | 8 W |
| Power consumption in rest | 4.5 W |
| position | 14.1/4 (close 0 nouver course) |
| Transformer sizing | 14 VA (class 2 power source) |
| Shaft Diameter | 1/2" to 1.05" round, centers on 3/4" with insert, 1.05" without insert |
| Electrical Connection | terminal block(s) inside junction box with knockouts |
| Overload Protection | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Operating Range | DC 210 V, 4 to 20 mA w/ ZG-R01 (500 Ω , 1/4 W resistor) |
| Input Impedance | 100 kΩ for 2 to 10 VDC (0.1 mA), 500 Ω |
| Position Feedback | for 4 to 20 mA |
| | DC 210 V, Max. 0.5 mA |
| Angle of rotation | Max. 95°, adjustable with mechanical end stop, 35° to 95° |
| Torque motor | 270 in-lbs [30 Nm] |
| direction of rotation motor | reversible with built-in switch |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 95 sec |
| Running time emergency control position | <20 sec @ -4°F to 122°F [-20°C to 50°C], <60 sec @ -22°F [-30°C] |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122 °F [-3050 °C] |
| Non-operating temperature | -40176 °F [-4080 °C] |
| Degree of Protection | IP66, NEMA 4, UL Enclosure Type 4 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA |
| | E60730-1:02, CE acc. to 2004/108/EC and |
| | 2006/95/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤71 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 1.02 kg |
| Auxiliary switch | 2 x SPDT, 3A resistive (0.5A inductive) @ 250 VAC, one set at 10°, one set at 85° |

†Rated Impulse Voltage 800V, Type of action 1.AA.B, Control Pollution Degree 4.

Torque min. 270 in-lb, for control of air dampers

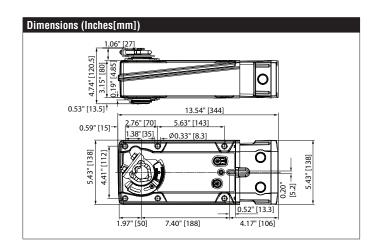
Application

For fail-safe, modulating control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. The actuator operates in response to a 2 to 10 VDC or, with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. A 2 to 10 VDC feedback signal is provided for position indication. Not to be used for a master-slave application.

Operation

The EF. 24-SR-S N4 series actuators provide true spring return operation for reliable failsafe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The EF.24-SR-S N4 series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The EF..24-SR-S N4 uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor. The microprocessor provides the intelligence to the ASIC to provide a constant rotation rate and to know the actuator's exact fail-safe position. The ASIC monitors and controls the brushless DC motor's rotation and provides a digital rotation sensing function to prevent damage to the actuator in a stall condition. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF. 24-SR-S N4 versions are provided with two built-in auxiliary switches. These SPDT switches provide safety interfacing or signaling, for example, for fan start-up. The switching function at the fail-safe position is fixed at 10°, the other switch function is fixed at 85°. The EF..24-SR-S N4 actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use 60°C/75°C copper (CU) conductor and wire size range 12-26 AWG, stranded or solid. If conduit is used, use flexible metal conduit; UL listed and CSA certified strain relief or conduit fitting suitable for outdoor applications, rated NEMA type 4, 4X, 6 or 6X or watertight.



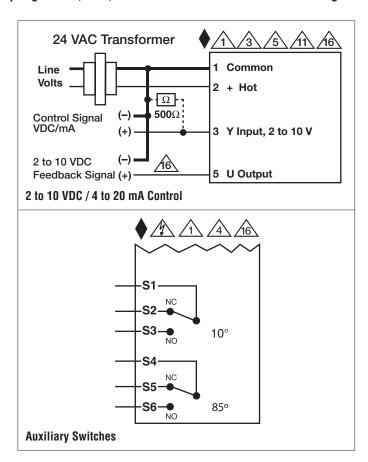
EFB24-SR-S N4 - Damper Actuator

NEMA 4, Modulating, Spring Return, 24 V, for 2 or 10 VDC or 4 to 20 mA Control Signal

| Accessorie | 35 |
|------------|---|
| AV8-25 | Shaft extension 240 mm [9.8"] |
| EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). |
| IND-EFB | Stop indicator |
| K9-2 | Spindle clamp set |
| KG10A | Straight ball joint with M8 |
| KH10 | Damper lever |
| KH-EFB | Actuator arm |
| SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). |
| T00L-07 | 13 mm wrench. |
| ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). |
| ZG-120 | Jackshaft mounting bracket. |
| ZG-DC1 | Damper clip for damper blade, 3.5" width. |
| ZG-DC2 | Damper clip for damper blade, 6" width. |
| ZG-EFB | Mounting kit for linkage operation EFA |
| ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). |
| ADS-100 | Analog to digital switch for modulating actuators. |
| IRM-100 | Input rescaling module for modulating actuators. |
| P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. |
| P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. |
| PS-100 | Actuator power supply and control simulator. |
| PTA-250 | Pulse width modulation interface for modulating actuators. |
| SGA24 | Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR |
| SGF24 | Positioners suitable for use with the modulating damper actuators LMA-SR, NMA-SR, SMA-SR and GMA-SR |
| ZG-R01 | 4 to 20 mA adaptor, 500Ω , $1/4$ W resistor w 6" pigtail wires. |
| ZG-R02 | 50% voltage divider kit (resistors with wires). |
| ZG-SGF | Mounting plate for SGF. |
| ZG-X40 | 120 to 24 VAC, 40 VA transformer. |
| | |

Typical Specification Spring return control damper actuators shall be direct coupled type which

require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuator must provide modulating damper control in response to a 2 to 10 VDC or, with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.



EFB24-SR-S N4 - Damper Actuator



NEMA 4, Modulating, Spring Return, 24 V, for 2 or 10 VDC or 4 to 20 mA Control Signal

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection



Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.



Provide overload protection and disconnect as required.



Actuators may also be powered by 24 VDC.



Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.



Only connect common to negative (-) leg of control circuits.



Actuators may be connected in parallel if not mechanically linked. Power consumption and input impedance must be observed.



Actuators are provided with a numbered screw terminal strip instead of a cable

EFCX120-S N4 - Damper Actuator

NEMA 4, On/Off, Spring Return, 100 to 240 VAC, 10 Second Fail-Safe











| | REG. EQUIP. |
|-------------------------------------|--|
| Technical Data | |
| Power Supply | 100240 VAC, -20% / +10%, 50/60 Hz, |
| | 100125 VDC, ±10% |
| Power consumption in operation | 9.5 W |
| Power consumption in rest | 4.5 W |
| position | |
| Transformer sizing | 21 VA @ 100 VAC, 29 VA @ 240 VAC |
| Shaft Diameter | 3/4" to 1.05" round, centers on 3/4" with |
| Electrical Connection | insert, 1.05" without insert |
| Electrical Connection | terminal block(s) inside junction box with knockouts |
| Overload Protection | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Angle of rotation | Max. 95°, adjustable with mechanical end |
| Angle of rotation | stop, 35° to 95° |
| Torque motor | 270 in-lbs [30 Nm] |
| direction of rotation motor | reversible with CW/CCW mounting |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring |
| 1 osition maleation | return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 75 sec |
| Running time emergency control | 10 sec @ -4°F to 122°F [-20°C to 50°C], |
| position | <15 sec @ -22°F to -4°F [-30°C to -20°C] |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122 °F [-3050 °C] |
| Non-operating temperature | -40176 °F [-4080 °C] |
| Degree of Protection | IP66, NEMA 4, UL Enclosure Type 4 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA |
| | E60730-1:02, CE acc. to 2004/108/EC and |
| | 2006/95/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤72 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 10.87 lb [4.93 kg] |
| Auxiliary switch | 2 x SPDT, 3A resistive (0.5A inductive) @ |
| | 250 VAC, one set at 10°, one set at 85° |

†Rated Impulse Voltage 4kV, Type of action 1.AA.B, Control Pollution Degree 4.

Torque min. 270 in-lb, for control of air dampers

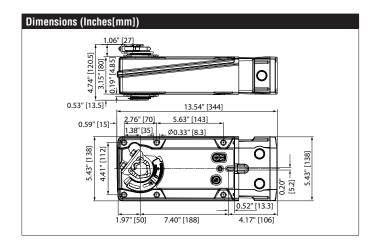
Application

For On/Off, fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. Control is On/Off from an auxiliary contact or a manual switch. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. Maximum of two EF's can be piggybacked for torque loads of up to 540 in-lbs. Minimum 1" diameter shaft and parallel wiring.

Operation

The EF..120-S N4 series actuators provide true spring return operation for reliable fail-safe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The EF..120-S N4 series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF..120-S N4 versions are provided with two built-in auxiliary switches. These SPDT switches provide safety interfacing or signaling, for example, for fan start-up. The switching function at the fail-safe position is fixed at 10°, the other switch function is fixed at 85°. The EF..120-S N4 actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use 60°C/75°C copper (CU) conductor and wire size range 12-26 AWG, stranded or solid. If conduit is used, use flexible metal conduit; UL listed and CSA certified strain relief or conduit fitting suitable for outdoor applications, rated NEMA type 4, 4X, 6 or 6X or watertight.



EFCX120-S N4 - Damper Actuator

NEMA 4, On/Off, Spring Return, 100 to 240 VAC, 10 Second Fail-Safe

| A | | |
|----------------------|--|--|
| Accessorie AV8-25 | S Shaft extension 240 mm [9.8"] | |
| EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). | |
| | ., ., ., | |
| IND-EFB | Stop indicator | |
| K9-2 | Spindle clamp set | |
| KG10A | Straight ball joint with M8 | |
| KH10 | Damper lever | |
| KH-EFB | Actuator arm | |
| SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). | |
| T00L-07 | 13 mm wrench. | |
| ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). | |
| ZG-120 | Jackshaft mounting bracket. | |
| ZG-DC1 | Damper clip for damper blade, 3.5" width. | |
| ZG-DC2 | Damper clip for damper blade, 6" width. | |
| ZG-EFB | Mounting kit for linkage operation EFA | |
| ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). | |
| P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. | |
| P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. | |
| PS-100 | Actuator power supply and control simulator. | |

Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.



Provide overload protection and disconnect as required.



Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.

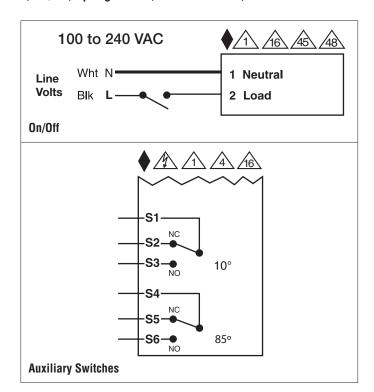
Actuators are provided with a numbered screw terminal strip instead of



a cable.

Actuators may be powered in parallel. Power consumption must be





EFCX24-S N4 - Damper Actuator

NEMA 4, On/Off, Spring Return, 24 V, 10 Second Fail-Safe











| | REG. EQUIP. |
|-------------------------------------|--|
| Technical Data | |
| Power Supply | 24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / |
| | +20% |
| Power consumption in operation | 9.5 W |
| Power consumption in rest | 4.5 W |
| position | 40.1/4 (-1 |
| Transformer sizing | 16 VA (class 2 power source) |
| Shaft Diameter | 3/4" to 1.05" round, centers on 3/4" with |
| Electrical Connection | insert, 1.05" without insert |
| Electrical Connection | terminal block(s) inside junction box with knockouts |
| Overload Protection | electronic throughout 0° to 95° rotation |
| Electrical Protection | actuators are double insulated |
| Angle of rotation | Max. 95°, adjustable with mechanical end |
| Aligio di Totation | stop, 35° to 95° |
| Torque motor | 270 in-lbs [30 Nm] |
| direction of rotation motor | reversible with CW/CCW mounting |
| direction of rotation spring-return | reversible with CW/CCW mounting |
| Position indication | visual indicator, 0° to 95° (0° is full spring |
| | return position) |
| Manual override | 5 mm hex crank (3/16" Allen), supplied |
| Running time motor | 75 sec |
| Running time emergency control | 10 sec @ -4°F to 122°F [-20°C to 50°C], |
| position | <15 sec @ -22°F to -4°F [-30°C to -20°C] |
| Ambient humidity | 5 to 95% RH non-condensing |
| Ambient temperature | -22122 °F [-3050 °C] |
| Non-operating temperature | -40176 °F [-4080 °C] |
| Degree of Protection | IP66, NEMA 4, UL Enclosure Type 4 |
| Housing material | Aluminum die cast and plastic casing |
| Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA |
| | E60730-1:02, CE acc. to 2004/108/EC and |
| McControl of the | 2006/95/EC |
| Noise level, motor | ≤56.5 dB (A) |
| Noise Level (Fail-Safe) | ≤72 dB (A) |
| Maintenance | maintenance free |
| Quality Standard | ISO 9001 |
| Weight | 10.83 lb [4.91 kg] |
| Auxiliary switch | 2 x SPDT, 3A resistive (0.5A inductive) @ |
| | 250 VAC, one set at 10°, one set at 85° |

†Rated Impulse Voltage 800V, Type of action 1.AA.B, Control Pollution Degree 4.

Torque min. 270 in-lb, for control of air dampers

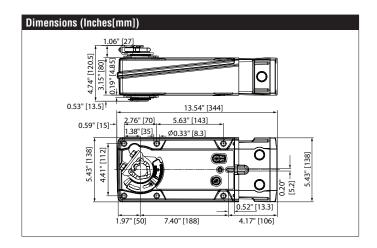
Application

For On/Off, fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. Control is On/Off from an auxiliary contact or a manual switch. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. Maximum of two EF's can be piggybacked for torque loads of up to 540 in-lbs. Minimum 1" diameter shaft and parallel wiring.

Operation

The EF.24-S N4 series actuators provide true spring return operation for reliable failsafe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The EF.24-S N4 series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The EF.24-S N4 versions are provided with two built-in auxiliary switches. These SPDT switches are provided for safety interfacing or signaling, for example, for fan start-up. The switching function at the fail-safe position is fixed at 10°, the other switch function is fixed at 85°. The EF.24-S N4 actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Installation Note: Use 60°C/75°C copper (CU) conductor and wire size range 12-26 AWG, stranded or solid. If conduit is used, use flexible metal conduit; UL listed and CSA certified strain relief or conduit fitting suitable for outdoor applications, rated NEMA type 4, 4X, 6 or 6X or watertight.







EFCX24-S N4 - Damper Actuator NEMA 4, On/Off, Spring Return, 24 V, 10 Second Fail-Safe

| Accessorie | |
|------------|--|
| AV8-25 | Shaft extension 240 mm [9.8"] |
| EF-P | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X). |
| IND-EFB | Stop indicator |
| K9-2 | Spindle clamp set |
| KG10A | Straight ball joint with M8 |
| KH10 | Damper lever |
| KH-EFB | Actuator arm |
| SH10 | Push rod for KG10A ball joint (36" L, 3/8" diameter). |
| T00L-07 | 13 mm wrench. |
| ZG-100 | Univ. right angle bracket (17" H x 11-1/8" W x 6" base). |
| ZG-120 | Jackshaft mounting bracket. |
| ZG-DC1 | Damper clip for damper blade, 3.5" width. |
| ZG-DC2 | Damper clip for damper blade, 6" width. |
| ZG-EFB | Mounting kit for linkage operation EFA |
| ZG-JSA-3 | 1.05" diameter jackshaft adaptor (12" L). |
| P475 | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts. |
| P475-1 | Shaft mount, non-Mercury aux. switch for 1" dia. shafts. |
| PS-100 | Actuator power supply and control simulator. |
| ZG-X40 | 120 to 24 VAC, 40 VA transformer. |

Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Wiring Diagrams



WARNING! LIVE ELECTRICAL COMPONENTS!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.



Provide overload protection and disconnect as required.



Actuators may also be powered by 24 VDC.



Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.

Actuators are provided with a numbered screw terminal strip instead of



a cable.

Actuators may be powered in parallel. Power consumption must be observed.



